

Linear Systems

dvt

TOV (Table of Values)

Substitution
Elimination
Graphing

Formal
check

POI (Point of Intersection)

Parallel $\begin{cases} 0x = 4 & \text{no solutions (error)} \\ 0x = 0 & \text{Coincident (infinite)} \\ 4x = 0 & \text{one solution} \end{cases}$

Analytical

Midpoint

$$M = \left\{ \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right\}$$

$$y = \underbrace{mx}_{\text{slope}} + \underbrace{b}_{\text{y-intercept}}$$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

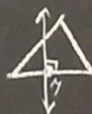
$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$x^2 + y^2 = r^2$$

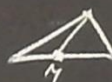
Prove Shape
Triangle
Square
etc...



Ⓒ Altitude
(No Midpoint - reciprocal)



Ⓓ Right Bisector
(Midpoint - reciprocal)



Ⓔ Median
(Midpoint to vertex)

Ⓒ Orthocenter

Ⓓ Circumcenter

Ⓓ Centroid

$$\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right)$$

Quadratics

Standard Form

$$y = ax^2 + bx + c$$

factor

expand
(bunny hops)

Partial Factoring
Completing the square
($x = -\frac{b}{2a}$) checking

expand

$$y = a(x-s)(x-t)$$

Factor Form

State zeroes

AOS

Sub AOS to find y
value of vertex

$$y = a(x-h)^2 + k$$

Vertex Form

Factoring

- ① GCF/Grouping
- ② Perfect square
± Difference of squares
- ③ Trinomial

MAN

Decomposition

1st & 2nd
differences

Transformation

$$y = a(x-h)^2 + k$$

Stretch
Compression
Horizontal
Shift
Left/Right
Vertical
Shift
Up/Down

$$y = ax^2 + bx + c$$

$$y = a(x-s)(x-t)$$

$$y = a(x-h)^2 + k$$

y-intercept
Zeroes

Vertex (h, k)

Quadratic Formula
→ find zeroes

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

D=0 1 zero

D>0 2 zeroes

D<0 none

Set y=0
move k
divide by a
both side
OR
x₁ OR x₂

$$c^2 = a^2 + b^2$$

P.L.O

Trigonometry

#3

SOHCAHTOA

$$\sin \theta = \frac{O}{H}$$

$$\cos \theta = \frac{A}{H}$$

$$\tan \theta = \frac{O}{A}$$

Similar Triangles

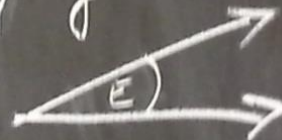
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

Proofs
AA
SAS
SSS

Angle of Elevation



Angle of Depression

